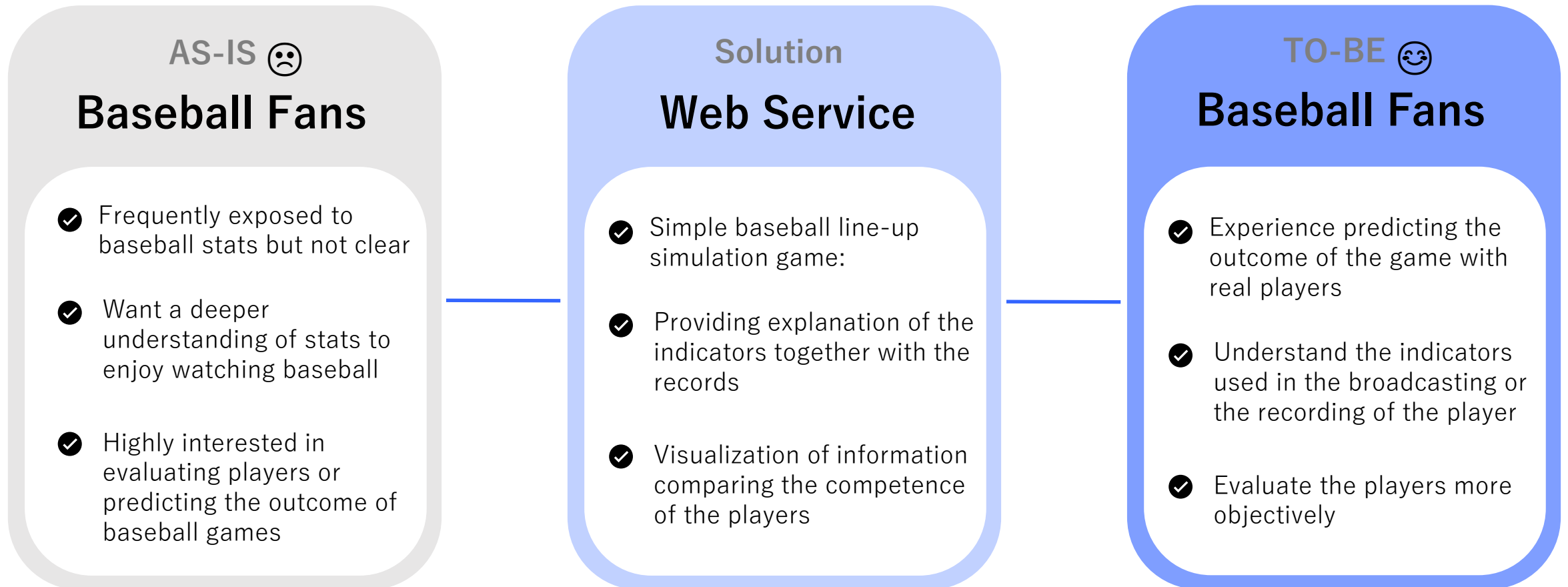


Baseball Metrics

Weekly Progress Meeting #2

From the last meeting ...



CONTENTS

- **Simulation Game**
 - UI
 - Data, Logics
- **Records**
 - Features
- **Comparison Analysis**
 - Features
 - Logics
- **Our Next Goal**

1. Batting Order Simulation - Setting

홈

게임

기록

선수 비교

상대 투수를 선택해주세요

순위	선수명	팀명	AVG	BB	SO	GDP	SLG	OBP	BA/RISP	대타타율	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	홍성호	두산	0.400	4	3	0	0	0	0	0	0	0
3	정수빈	두산	0.400	1	2	0	0	0	0	0	0	0
4	김재호	두산	0.385	0	3	0	0	0	0	0	0	0
5	양석환	두산	0.333	2	2	0	0	0	0	0	0	0
6	허경민	두산	0.333	2	2	1	0	0	0	0	0	0
7	박유연	두산	0.308	2	2	0	0	0	0	0	0	0
8	강승호	두산	0.250	4	1	0	0	0	0	0	0	0
9	김민태	두산	0.222	4	2	0	0	0	0	0	0	0
10	로하스	두산	0.167	0	2	0	0	0	0	0	0	0
11	이유찬	두산	0.167	2	1	0	0	0	0	0	0	0
12	양찬열	두산	0.167	1	1	0	0	0	0	0	0	0
13	전민재	두산	0.111	3	3	1	0	0	0	0	0	0
14	송승환	두산	0.091	2	3	0	0	0	0	0	0	0
15	박준영	두산	0.091	0	4	0	0	0	0	0	0	0

구단을 선택해주세요

LG

KT

SSG

NC

두산

KIA

롯데

한화

삼성

키움

ALL



타자를 선택해주세요




순위	선수명	팀명	AVG	BB	SO	GDP	SLG	OBP	BA/RISP	phLI	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	홍성호	두산	0.400	4	3	0	0	0	0	0	0	0
3	정수빈	두산	0.400	1	2	0	0	0	0	0	0	0
4	김재호	두산	0.385	0	3	0	0	0	0	0	0	0




- Pick the opposing team's pitcher (one)
- Use information on the top 30 pitchers provided by 'Statistiz'(regardless of the teams)
- Statistical indicators of pitcher we use here: Win-lose, innings per game (total innings/entrance), earned run, hit, home run, strikeout, walk, ERA, WHIP, pitch type
- Mouse Hover on Indicators: One-line description of the indicator
"It is calculated based on (recorded values) and has (relation) to (athlete's performance)."

1. Batting Order Simulation - Setting

구단을 선택해주세요

타자를 선택해주세요

순위	선수명	팀명	AVG	BB	SO	GDP	SLG	OBP	BA/RISP	phLI	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	홍성호	두산	0.400	4	3	0	0	0	0	0	0	0
3	장수빈	두산	0.400	1	2	0	0	0	0	0	0	0
4	김재호	두산	0.385	0	3	0	0	0	0	0	0	0
5	양석환	두산	0.333	2	2	0	0	0	0	0	0	0
6	허경민	두산	0.333	2	2	1	0	0	0	0	0	0
7	박유연	두산	0.308	2	2	0	0	0	0	0	0	0
8	강승호	두산	0.250	4	1	0	0	0	0	0	0	0
9	김인태	두산	0.222	4	2	0	0	0	0	0	0	0
10	로하스	두산	0.167	0	2	0	0	0	0	0	0	0
11	이유찬	두산	0.167	2	1	0	0	0	0	0	0	0
12	양찬열	두산	0.167	1	1	0	0	0	0	0	0	0
13	전민재	두산	0.111	3	3	1	0	0	0	0	0	0
14	송승환	두산	0.091	2	3	0	0	0	0	0	0	0
15	박준영	두산	0.091	0	4	0	0	0	0	0	0	0

선택한 타자의 타순을 정해주세요 (타순은 어떻게 칠하나요?)

1 두산 2 두산 3 두산 4 두산 5 두산 6 두산 7 두산 8 두산 9 두산

양의지 양의지 양의지 양의지 양의지 양의지 양의지 양의지 양의지

대타 두산 대타 두산 대타 두산 대타 두산 대타 두산 대타 두산 투수 NC

- Select YOUR team
- Pick 9-15 batters
- Statistical indicators of batters we use here: AVG(타율), BB(볼넷), SO(삼진), GDP(병살타), SLG(장타율), OBP(출루율), BA/RISP(득점권타율), phLI(대타LI), GO/AO(땅볼/뜯공), BB/K(볼넷/삼진)
- Mouse Hover on Indicators: One-line description of the indicator
- Batters you picked(clicked) will show up below in sequence

1. Batting Order Simulation - Setting

5	양석환	두산	0.333	2	2	0	0	0	0	0	0	0
6	허경민	두산	0.333	2	2	1	0	0	0	0	0	0
7	박유연	두산	0.308	2	2	0	0	0	0	0	0	0
8	강승호	두산	0.250	4	1	0	0	0	0	0	0	0
9	김민태	두산	0.222	4	2	0	0	0	0	0	0	0
10	로하스	두산	0.167	0	2	0	0	0	0	0	0	0
11	이유찬	두산	0.167	2	1	0	0	0	0	0	0	0
12	양찬열	두산	0.167	1	1	0	0	0	0	0	0	0
13	전민재	두산	0.111	3	3	1	0	0	0	0	0	0
14	송승환	두산	0.091	2	3	0	0	0	0	0	0	0
15	박준영	두산	0.091	0	4	0	0	0	0	0	0	0

선택한 타자의 타순을 정해주세요 (타순은 어떻게 정하나요?)

1 두산
양의지

2 두산
양의지

3 두산
양의지

4 두산
양의지

5 두산
양의지

6 두산
양의지

7 두산
양의지

8 두산
양의지

9 두산
양의지

대타 두산
양의지

대타 두산
양의지

대타 두산
양의지

대타 두산
양의지

대타 두산
양의지

대타 두산
양의지

투수 NC
페디

시뮬레이션 시작하기

- Mouse Dragging: make your own batting order
- If you pick more than 9, you also have pinch-hitters
- You can also see the pitcher you picked at first.
- Offer hints for each order (which indicators to look at for specific order)

1. Batting Order Simulation – Game Play

The screenshot shows a baseball batting order simulation game interface. The interface includes a scoreboard at the top, a current player card on the left, a tip bar in the center, a diamond-shaped field diagram, a strike/ball/out counter, a batting order list on the right, and action buttons at the bottom. Blue lines connect text annotations to specific UI elements.

Scoreboard

1 2 3 4 5 6 7 8 9 10 11 12 R H E B

Current player

두산 양의지
NOW PLAYING

At-bat Status:
Opposing Pitcher
On-base situation, S,B,O counting

Pinch-hitters:
Able when you click "pinch-hitter" btn

Tip !

P NC 페 디

STRIKE BALL OUT

Batting orders:
current player highlighted

1 두산 양의지
2 두산 양의지
3 두산 양의지
4 두산 양의지
5 두산 양의지
6 두산 양의지
7 두산 양의지
8 두산 양의지
9 두산 양의지

After each at-bat,
decide how to proceed the game:
Refer to the tip!

진행하기 ▶ 대타 ⇐ 번트 ✎



Game Logic



Data Crawling

- Our service focus on KBO(Korean Baseball Organization) league. So we need KBO league players' data.
- KBO doesn't provide data API → Data Crawling
- statiz.co.kr

2023

연도

시작

끝

팀:전체

포지션

정규

규정

상황

옵션

[자동 : 전체]

공지

시즌초 투수WAR 계산 불안정성을 줄이기 위해, (전반기까지) 상대Level = 현재 값 * 시즌진행율2 + 리그 평균 * (1 - 시즌진행율2)

기본

확장

가치

클러치

타석

타구1

타구2

파워

팀배팅1

팀배팅2

도루

주루

구종가치

구종구사

순	이름	팀	정렬	WAR*	G	타석	타수	득점	안타	2타	3타	홈런	루타	타점	도루	도실	볼넷	사구	고4	삼진	병살	희타	희비	비율				
																								타율	출루	장타	OPS	wOBA
1	노시환	23 한 3B	6.93	131	595	514	85	153	30	1	31	278	101	2	1	74	4	5	118	13	0	3	.298	.388	.541	.929	.418	
2	김혜성	23 키 2B	6.19	137	621	556	104	186	29	6	7	248	57	25	3	57	3	3	77	6	0	5	.335	.396	.446	.842	.392	
3	최정	23 S 3B	5.78	128	552	471	94	140	31	0	29	258	87	7	3	59	15	6	87	12	1	6	.297	.388	.548	.936	.418	
4	양의지	23 두 C	5.40	129	509	438	56	134	23	0	17	208	68	8	0	57	11	8	56	20	0	3	.306	.397	.475	.872	.399	
5	오스틴	23 L 1B	5.22	139	583	520	87	163	29	4	23	269	95	7	3	53	3	2	75	11	0	7	.313	.376	.517	.893	.405	
6	홍창기	23 L RF	5.17	141	643	524	109	174	35	2	1	216	65	23	23	88	22	3	83	6	3	6	.332	.444	.412	.856	.407	
7	구자욱	23 삼 RF	4.78	119	515	453	65	152	37	1	11	224	71	12	4	53	4	2	81	5	2	3	.336	.407	.494	.902	.414	
8	소크라테스	23 K CF	4.58	142	608	547	91	156	31	3	20	253	96	15	6	52	1	4	80	13	0	8	.285	.344	.463	.806	.366	
9	손아섭	23 N DH	4.39	140	609	551	97	187	36	3	5	244	65	14	3	50	2	2	67	10	1	5	.339	.393	.443	.836	.390	
10	박건우	23 N RF	4.25	130	533	458	70	146	34	2	12	220	85	7	5	56	9	0	71	14	1	9	.319	.397	.480	.877	.403	
순	이름	팀	정렬	WAR*	G	타석	타수	득점	안타	2타	3타	홈런	루타	타점	도루	도실	볼넷	사구	고4	삼진	병살	희타	희비	비율				
																								타율	출루	장타	OPS	wOBA
11	문보경	23 L 3B	4.13	131	542	469	77	141	29	5	10	210	72	9	9	58	2	2	83	5	9	4	.301	.377	.448	.825	.376	
12	에레디아	23 S LF	4.12	122	523	473	76	153	29	0	12	218	76	12	8	39	9	4	75	13	1	1	.323	.385	.461	.846	.391	

There are 293 batters (More than 1 AB)

There are 284 pitchers (More than 0.1 inning)

Each batter has 303 indicator

Each pitcher has 308 indicator

$293 \times 303 + 284 \times 308 = 176,251$ items

At bat (AB) is a batter's turn batting against a pitcher. It is different from a plate appearance.

AB doesn't include BB, sacrifice hit, Hit by a pitch, ...

Data used in game

- To prevent error due to lack of sample data, Only 189 batters were used in the game. (More than 50AB)
- Difficult to consider pitcher replacement, number of pitches, pitcher's stamina, list of replacement pitchers, etc. Consider them can damage simplicity of the game.
- Ignore pitcher's stamina (if not, we will face difficulties mentioned)
- Only the starting pitchers can be selected. Only 30 pitchers can be selected (Top 30 starting pitchers by WAR(one of the indicator), indicator can be changed)

Game function - Goal

Input

Batter, Pitcher, Runner, Out count

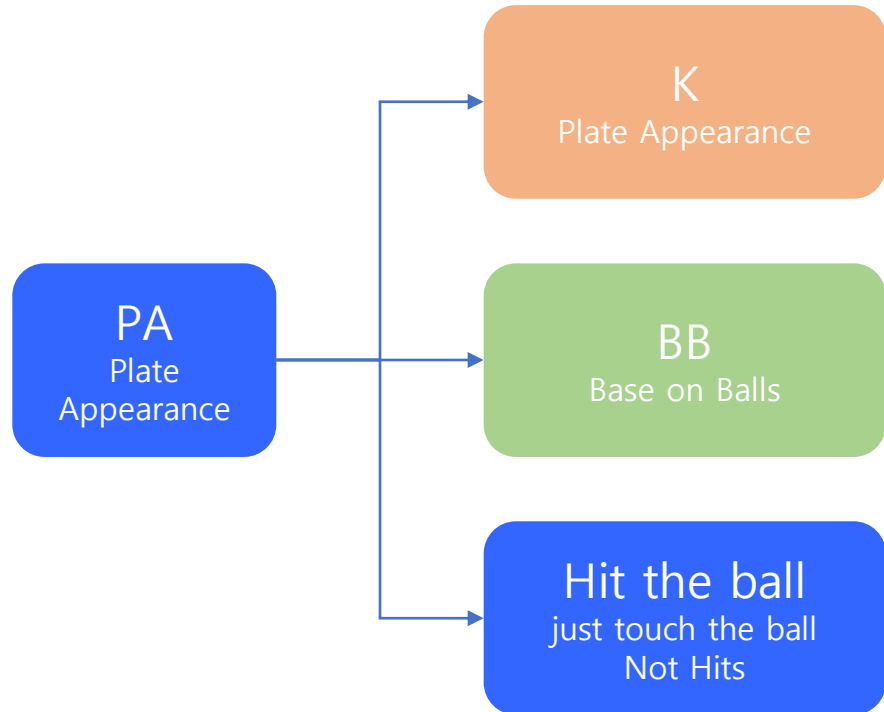
Function Goal:

At PA(Plate appearance),
using the data received as input, find the
Probability corresponding to each output.

Output

Strikeout, Walk(BB), Hit(Single, Double, Triple),
Homerun, Double play, Ground ball(out), Fly ball(out)

Game function

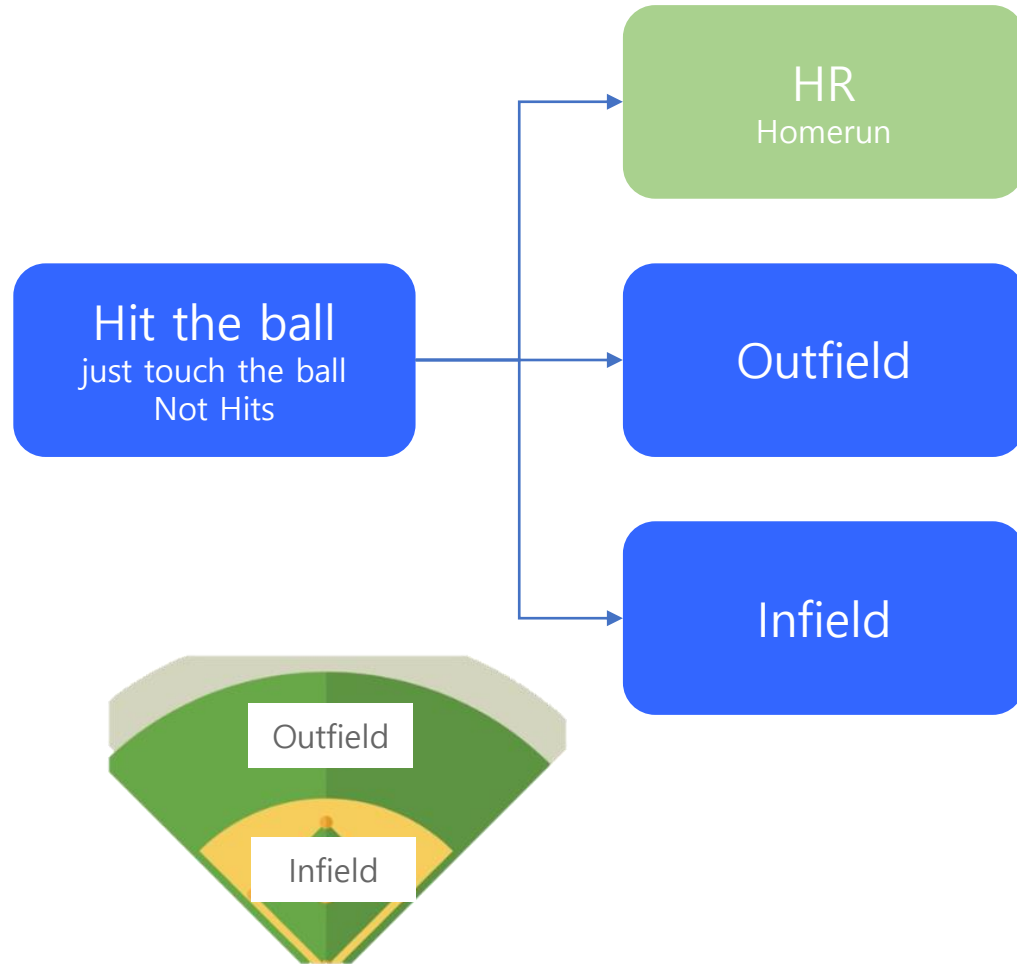


K%: Strikeouts per PA

BB%: Based on Ball(Walk) per PA

$$1 - K\% - BB\%$$

Game function



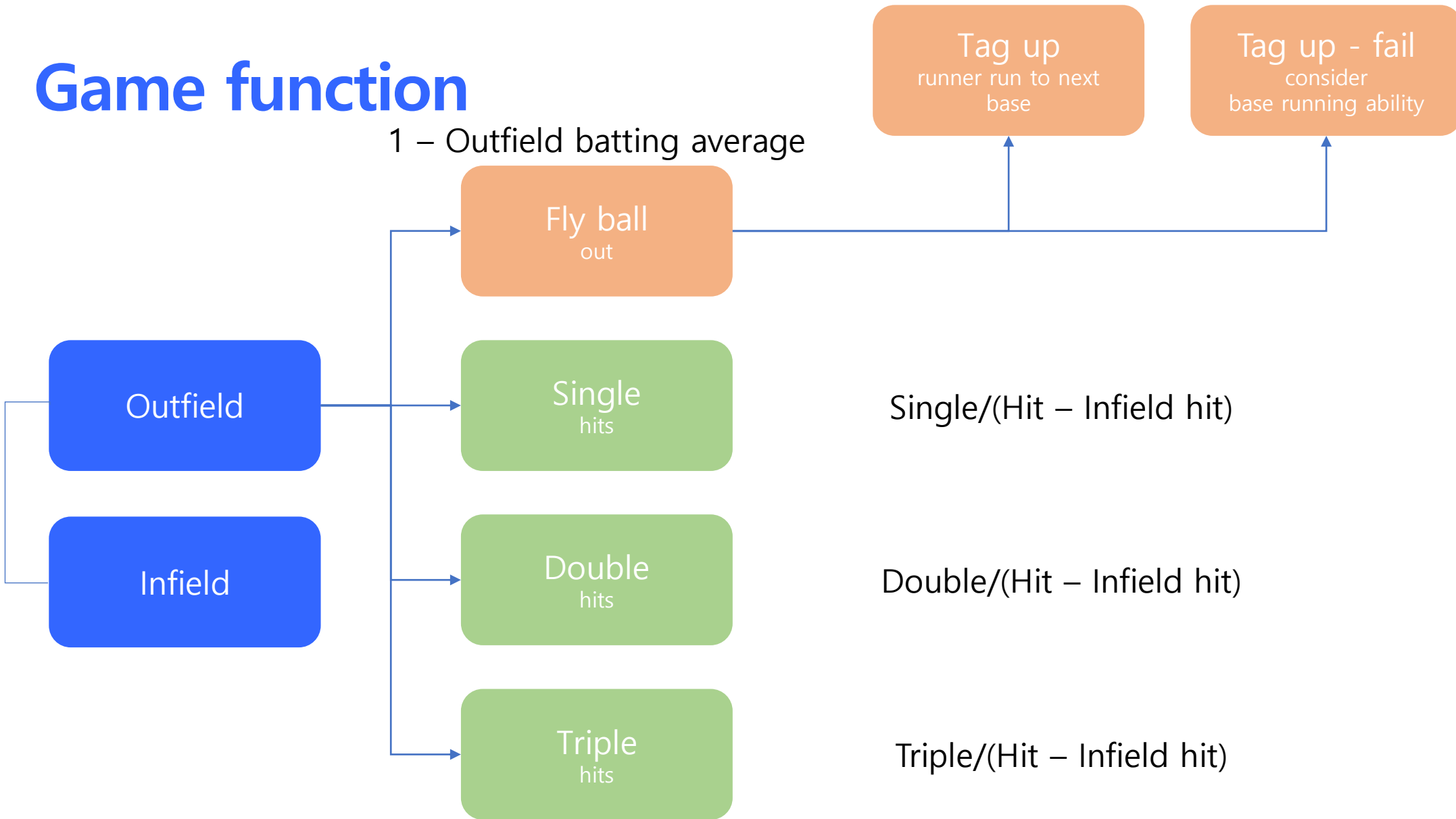
HR%: Homerun per AB

Outfield batted ball percentage

Infield batted ball percentage

Game function

1 – Outfield batting average

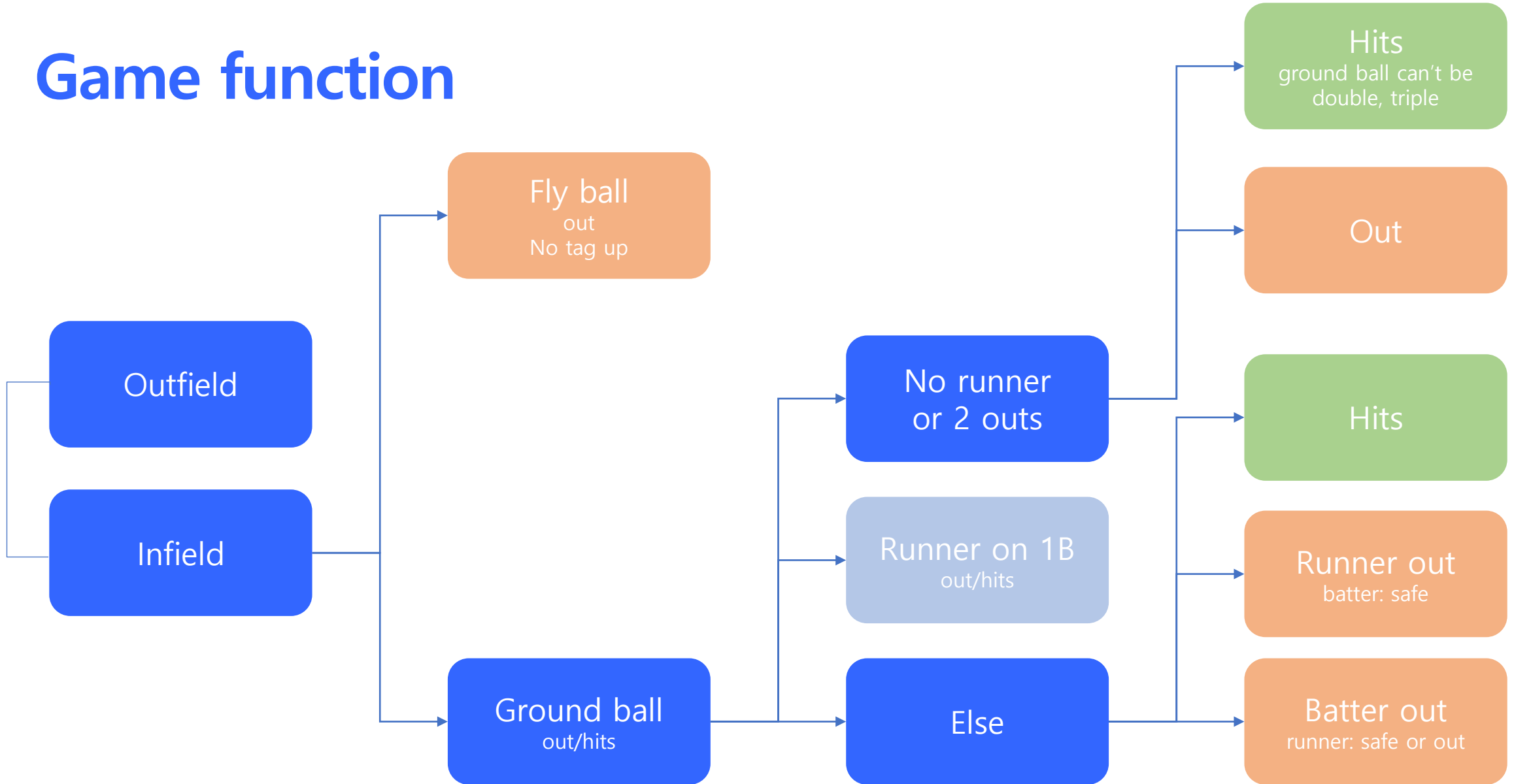


Game function – point

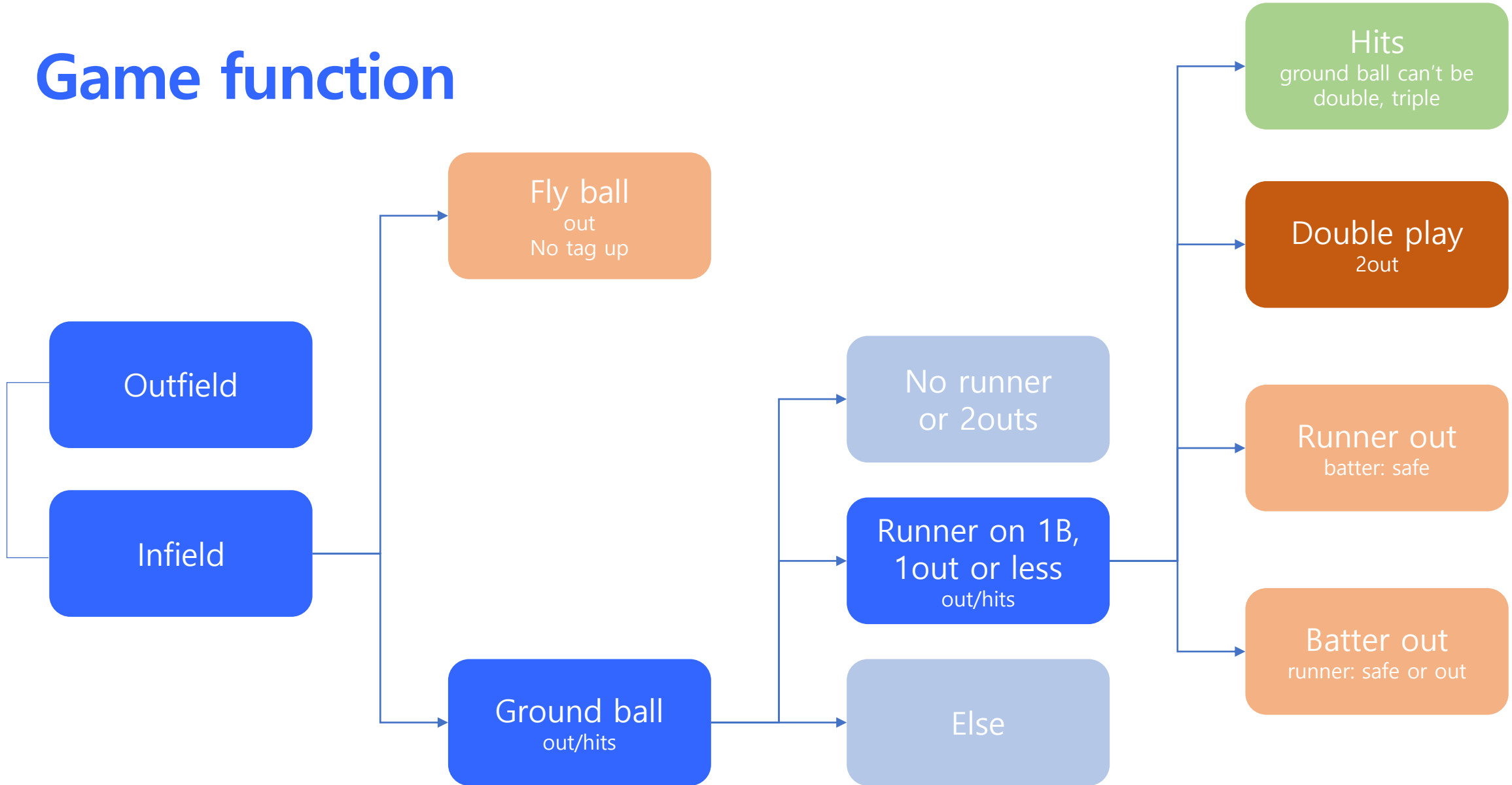
- Each branch divided based on actual probability.
- e.g., 2023 Choo ShinSoo:
$$\text{BB\%} = \text{BB}/\text{AB} = 65/462 = 14.1\%$$
$$\text{K\%} = \text{K}/\text{AB} = 79/462 = 17.1\% \dots$$
- For each branch, we need to add **weights that vary depending on the pitcher, runners, and outs.** => By adjusting the weights, find weights that increase overall accuracy.
- e.g., at the scoring position, result may be change by weight = $a \times (\text{RISP} - \text{AVG})$
RISP: Runners in scoring position, AVG at RISP
AVG: Batting average
ChooShinSoo – RISP: .247 AVG: .251 => $a \times (-0.004)$ KooJaWook – RISP: .403 AVG: .336 => $a \times 0.067$

Continuously considering what indicator to use and how to use them. The goal is to complete it by the midterm presentation.

Game function



Game function





Player Record Room



Player Record Room

LOGO

홈

게임

기록

선수 비교

찾고 싶은 선수를 검색하세요

NC 3

두산 3

삼성 3

SSG 3

기아 3

한화 0

롯데 0

LG 0

키움 0

kt 0

2

팀 타자/투수

기본, 확장, 클러치, 타구1, 타구2, 팀매팅1, 도루, 수루

1

@@를 통해 계산한다. 해당 지표를 통해 &&를 파악할 수 있다.

자세한 설명 보기 >

3

대표적인 지표

☐ 지표 1
 ☐ 지표 2
 ☐ 지표 3
 ☐ 지표 4

확장과 관련된 지표

☐ 지표 1
 ☐ 지표 2
 ☐ 지표 3
 ☐ 지표 4

스탯 필터링

순

이름

팀

정렬

WAR*

G

타석

타수

득점

안타

2타

3타

홈런

루타

타점

도루

도실

볼넷

사구

고4

삼진

병살

희타

희비

타율

출루

장타

OPS

wOBA

wRC+

WAR*

1	양의지	23 두 C	5.54	124	497	426	55	133	23	0	17	207	68	8	0	57	11	8	56	19	0	3	.312	.404	.486	.890	.407	156.7	5.54
2	정수빈	23 두 CF	3.84	132	565	481	74	137	14	11	2	179	33	38	5	63	7	1	63	2	12	2	.285	.374	.372	.747	.349	110.3	3.84
3	로하스	23 두 LF	2.94	118	449	389	51	98	23	4	18	183	62	0	1	54	3	2	65	5	0	3	.252	.345	.470	.816	.371	132.9	2.94
4	양석환	23 두 1B	2.60	135	565	509	72	143	27	0	21	233	89	4	0	39	6	2	23	6	0	5	.126	.126	.126	.450	.291	27.2	2.60
5	김재호	23 두 SS	2.10	87	289	236	32	70	13	0	3	92	28	4	0	30	8	2	23	6	0	5	.233	.339	.390	.701	.352	113.2	2.10
6	허경민	23 두 3B	1.89	128	471	426	43	112	21	1	7	156	47	9	3	34	6	3	26	6	0	5	.263	.323	.360	.689	.322	95.9	1.89
7	강승호	23 두 2B	1.71	122	442	404	51	107	18	6	7	158	57	13	5	27	6	0	106	3	0	3	.333	.433	.519	.819	.399	127.9	1.71
8	김재환	23 두 DH	0.87	131	481	402	40	89	15	0	10	134	46	3	1	72	5	100	0	0	0	1	.100	.100	.100	.332	.299	77.4	0.87
9	이유찬	23 두 2B	0.48	101	237	208	30	51	7	2	1	65	16	11	5	20	3	50	0	0	0	1	.245	.319	.311	.632	.299	77.4	0.48
10	박계범	23 두 SS	0.07	76	192	167	18	37	6	0	2	49	15	2	2	15	2	44	0	0	0	1	.111	.111	.111	.222	.111	22.2	0.07

1. mouseover at indicator name -> brief description. you can click "learn more" and move to detailed description page
2. Recommended Indicator Bundle
3. Customize displayed indicators [checkbox]
4. Advanced sorting

Player Record Room

LOGO

홈 게임 기록 선수 비교

찾고 싶은 선수를 검색하세요

NC	3	두산	3	삼성	3	SSG	3	기아	3
한화	0	롯데	0	LG	0	키움	0	키움	0


커스텀

스택 필터링 

순	이름	팀	정렬	WAR*	G	타석	타수	득점	안타	2타	3타	홈런	루타	타점	도루	도실	볼넷	사구	고4	삼진	병살	희타	희비	비율					WAR*
			WAR*																					타율	출루	장타	OPS	wOBA	wRC+

전체 범위 ☐

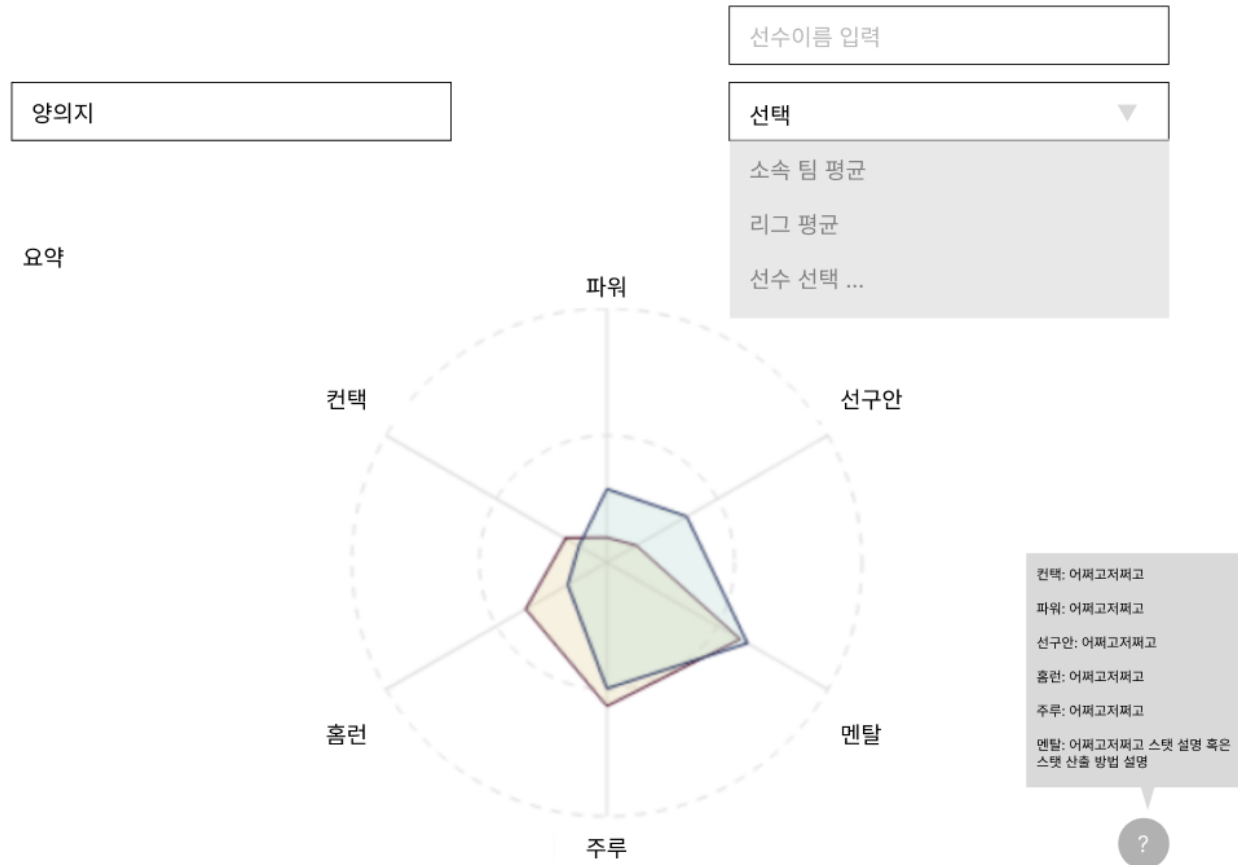
최소 20 300 최대



1. mouseover at indicator name -> brief description. you can click "learn more" and move to detailed description page
2. Recommended Indicator Bundle
3. Customize displayed indicators
4. Advanced sorting:
click indicator – Descending / Ascending order
Range can be specified.
Two or more indicators can be specified.

[illegible]

Player Comparison



Graph taken from other games

You can choose **two players**(or team averages, league averages) and **compare** them.

You can see

1. **radial graph**
2. **bar graph**

6 ability – by 0 ~ 100

Power : SLG(expected numbers of bases during AB)

Contact : using Contact rate, Contact rate after 2strikes

Homerun : Homerun

Running : G12%(Probability of get 2B from 1B in a ground situation), F34%(Probability of get Home base from 3B in a fly situation)

Mental : Clutch ability using WPA(win probability added), RISP-AVG

Batting eye: using rate of picking out Ball after 2 strikes, LSO%(looking strikeout/strikeout)

Player Comparison



You can choose two players(or team averages, league averages) and compare their ability.

You can see

1. radial graph
2. bar graph

Representative indicators can be checked in graphs



Photos taken from other games

Until the next presentation

- Start Implementation (Front, Back)
- Implement function of the game
- Setting up test method and test for game logic(function)



QA